Organisms and Their Environment

4-2 Students will demonstrate an understanding of the characteristics and patterns of behavior that allow organisms to survive in their own distinct environments. (Life Science)

4.2.1 Classify organisms into major groups (including plants or animals, flowering or nonflowering plants, and vertebrates [fish, amphibians, reptiles, birds, and mammals] or invertebrates) according to their physical characteristics.
Taxonomy level: 2.3-B Understand Conceptual Knowledge

Previous/Future knowledge: This is the first time students have been introduced to the concept of vertebrates and invertebrates. In 2nd grade (2-2.2), students were introduced to the characteristics of mammals, birds, amphibians, reptiles, fish, and insects. Students will study in further detail the invertebrates in 6th grade (6-3.1).

It is essential for students to know that many organisms can be classified into two major groups —plants or animals—based on their physical characteristics.

- Plants can further be divided into flowering or nonflowering plants.
- Animals can be divided into vertebrates and invertebrates.
- Vertebrates can further be divided into fish, amphibians, reptiles, birds, and mammals.

Plants are organisms that are made of many parts and are capable of making their own food. Many different types of plants have been identified. Some plants produce flowers while other plants do not produce flowers.

Flowering plant

- Flowering plants are those plants that make seeds within flowers.
- Some flowers become the fruits that contain seeds.
- Examples are grasses, roses, oak trees, fruit trees, tomatoes, or bean plants.

Nonflowering plants

- Nonflowering plants are those plants that make seeds within cones or produce spores instead of seeds.
- Some examples of nonflowering plants are pines, spruce, or cedar trees that produce cones, and ferns, mosses, and lichens that produce spores.

Animals are organisms that can be made of many parts but cannot make their own food. They must get energy from eating plants or other animals. Animals are classified according to whether or not they have a backbone.

Vertebrates

- Animals with backbones.
- Vertebrates share other physical characteristics, for example, a protective skin covering, an inside skeleton, muscles, blood that circulates through blood vessels, lungs or gills for breathing.

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- Vertebrates are divided into five groups based on physical characteristics:
  - *Fish* breathe with gills; (most) have scales and fins; most lay eggs; have a body temperature that changes with its environment
  - *Amphibians* spend the first part of their life they breathe with gills in water, and the adults breathe with lungs on land; have smooth, moist skin; most lay eggs; have a body temperature that changes with its environment
  - *Reptiles* breathe with lungs; have scales or plates; most lay eggs; have a body temperature that changes with its environment
  - *Birds* breathe with lungs; have feathers, a beak, two wings, and two feet; lay eggs; have a constant body temperature
  - *Mammals* breathe with lungs; have fur or hair; can nurse their young with milk; usually give birth to live offspring; have a constant body temperature

Invertebrates

- Animals without backbones.
- Some have a hard outer covering or a shell, for example insects, crabs, or clams.
- Others do not have a hard outer covering or a shell, for example jellyfish or worms.
- Other examples of invertebrates are spiders, shrimp, crayfish, sponges, sea stars, or snails.

It is not essential for students to know the scientific classification system or the difference between plant and animal cells. Students do not need to classify invertebrates into specific groups (for example, mollusks, arthropods, or arachnids). They do not need to identify the parts of flowering plants.

Assessment Guidelines:

The objective of this indicator is to *classify* organisms according to their physical characteristics; therefore, the primary focus of assessment should be to determine the major group an organism is in based on the description. However, appropriate assessments should also require students to *recognize* organisms of each of the major groups; *summarize* the physical characteristics of the major groups of plants and animals; *compare* the characteristics of the groups of vertebrates; *exemplify* vertebrate and invertebrate animals, and flowering and nonflowering plants; or *illustrate* the major groups using pictures or words.